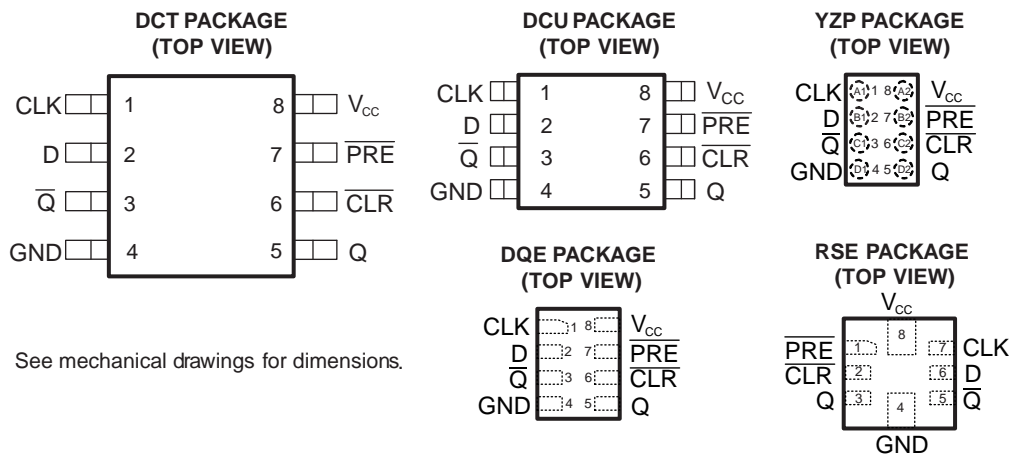


## SINGLE POSITIVE-EDGE-TRIGGERED D-TYPE FLIP-FLOP WITH CLEAR AND PRESET

Check for Samples: [SN74LVC1G74](#)

### FEATURES

- Available in the Texas Instruments NanoFree™ Package
- Supports 5-V  $V_{CC}$  Operation
- Inputs Accept Voltages to 5.5 V
- Max  $t_{pd}$  of 5.9 ns at 3.3 V
- Low Power Consumption, 10- $\mu$ A Max  $I_{CC}$
- $\pm 24$ -mA Output Drive at 3.3 V
- Typical  $V_{OLP}$  (Output Ground Bounce)  $< 0.8$  V at  $V_{CC} = 3.3$  V,  $T_A = 25^\circ\text{C}$
- Typical  $V_{OHV}$  (Output  $V_{OH}$  Undershoot)  $> 2$  V at  $V_{CC} = 3.3$  V,  $T_A = 25^\circ\text{C}$
- $I_{off}$  Supports Live Insertion, Partial Power Down Mode, and Back Drive Protection
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)



### DESCRIPTION/ORDERING INFORMATION

This single positive-edge-triggered D-type flip-flop is designed for 1.65-V to 5.5-V  $V_{CC}$  operation.

NanoFree™ package technology is a major breakthrough in IC packaging concepts, using the die as the package.

A low level at the preset ( $\overline{PRE}$ ) or clear ( $\overline{CLR}$ ) input sets or resets the outputs, regardless of the levels of the other inputs. When  $\overline{PRE}$  and  $\overline{CLR}$  are inactive (high), data at the data (D) input meeting the setup time requirements is transferred to the outputs on the positive-going edge of the clock pulse. Clock triggering occurs at a voltage level and is not related directly to the rise time of the clock pulse. Following the hold-time interval, data at the D input can be changed without affecting the levels at the outputs.

This device is fully specified for partial-power-down applications using  $I_{off}$ . The  $I_{off}$  circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

NanoFree is a trademark of Texas Instruments.

**ORDERING INFORMATION**

T <sub>A</sub>	PACKAGE <sup>(1) (2)</sup>		ORDERABLE PART NUMBER	TOP-SIDE MARKING <sup>(3)</sup>
-40°C to 85°C	NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YZP (Pb-free)	Reel of 3000	SN74LVC1G74YZPR	___DP_
	QFN - RSE	Reel of 3000	SN74LVC1G74RSER	DP
	μQFN - DQE		SN74LVC1G74RSE2 <sup>(4)</sup>	
-40°C to 125°C	SSOP – DCT	Reel of 3000	SN74LVC1G74DCTR	N74_ _ _
	VSSOP – DCU	Reel of 3000	SN74LVC1G74DCUR	N74_
			SN74LVC1G74DCURG4	
		Reel of 250	SN74LVC1G74DCUT	

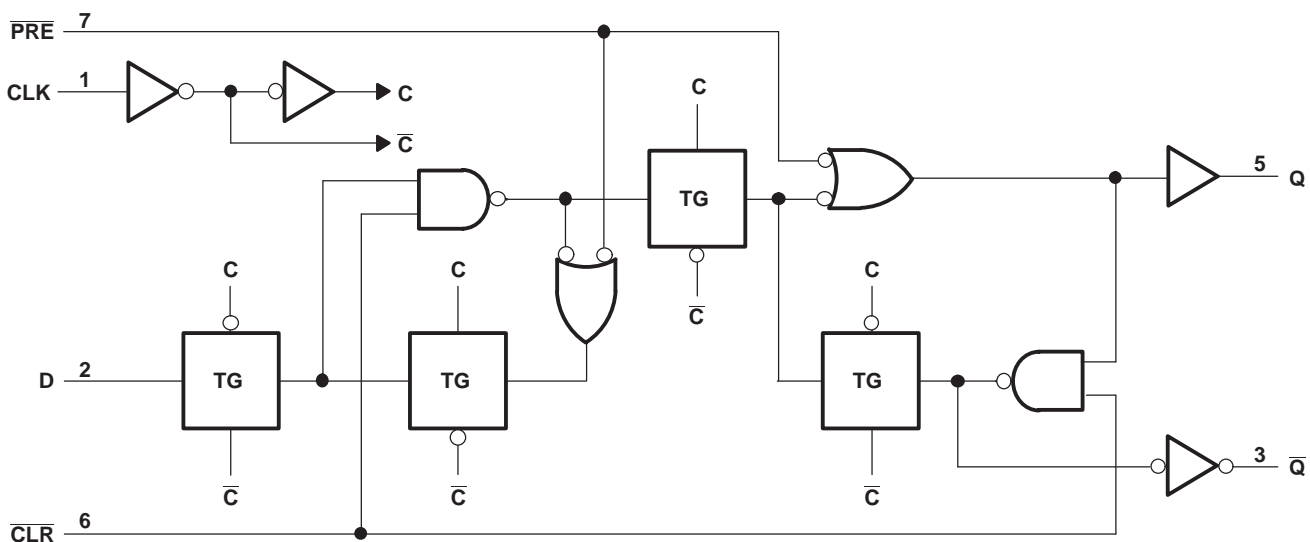
- (1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at [www.ti.com](http://www.ti.com).
- (2) Package drawings, thermal data, and symbolization are available at [www.ti.com/packaging](http://www.ti.com/packaging).
- (3) DCT: The actual top-side marking has three additional characters that designate the year, month, and assembly/test site.  
DCU: The actual top-side marking has one additional character that designates the wafer fab/assembly site.  
YZP: The actual top-side marking has three preceding characters to denote year, month, and sequence code, and one following character to designate the wafer fab/assembly site. Pin 1 identifier indicates solder-bump composition (1 = SnPb, • = Pb-free).
- (4) Pin 1 orientation at quadrant 3 in Tape.

**FUNCTION TABLE**

INPUTS				OUTPUTS	
$\overline{PRE}$	$\overline{CLR}$	CLK	D	Q	$\overline{Q}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H <sup>(1)</sup>	H <sup>(1)</sup>
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q <sub>0</sub>	$\overline{Q}_0$

- (1) This configuration is nonstable; that is, it does not persist when  $\overline{PRE}$  or  $\overline{CLR}$  returns to its inactive (high) level.

**LOGIC DIAGRAM (POSITIVE LOGIC)**



**ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>**

over operating free-air temperature range (unless otherwise noted)

		MIN	MAX	UNIT
$V_{CC}$	Supply voltage range	-0.5	6.5	V
$V_I$	Input voltage range <sup>(2)</sup>	-0.5	6.5	V
$V_O$	Voltage range applied to any output in the high-impedance or power-off state <sup>(2)</sup>	-0.5	6.5	V
$V_O$	Voltage range applied to any output in the high or low state <sup>(2) (3)</sup>	-0.5	$V_{CC} + 0.5$	V
$I_{IK}$	Input clamp current	$V_I < 0$	-50	mA
$I_{OK}$	Output clamp current	$V_O < 0$	-50	mA
$I_O$	Continuous output current		±50	mA
	Continuous current through $V_{CC}$ or GND		±100	mA
$\theta_{JA}$	Package thermal impedance <sup>(4)</sup>	DCT package	220	°C/W
		DCU package	227	
		YZP package	102	
		RSE Package	243	
$T_{stg}$	Storage temperature range	-65	150	°C

- (1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input negative-voltage and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- (3) The value of  $V_{CC}$  is provided in the recommended operating conditions table.
- (4) The package thermal impedance is calculated in accordance with JESD 51-7.

**RECOMMENDED OPERATING CONDITIONS<sup>(1)</sup>**

			MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage	Operating	1.65	5.5	V
		Data retention only	1.5		
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 1.65 V to 1.95 V	0.65 × V <sub>CC</sub>		V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7		
		V <sub>CC</sub> = 3 V to 3.6 V	2		
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.7 × V <sub>CC</sub>		
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 1.65 V to 1.95 V	0.35 × V <sub>CC</sub>		V
		V <sub>CC</sub> = 2.3 V to 2.7 V	0.7		
		V <sub>CC</sub> = 3 V to 3.6 V	0.8		
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.3 × V <sub>CC</sub>		
V <sub>I</sub>	Input voltage		0	5.5	V
V <sub>O</sub>	Output voltage		0	V <sub>CC</sub>	V
I <sub>OH</sub>	High-level output current	V <sub>CC</sub> = 1.65 V	–4		mA
		V <sub>CC</sub> = 2.3 V	–8		
		V <sub>CC</sub> = 3 V	–16		
			–24		
		V <sub>CC</sub> = 4.5 V	–32		
I <sub>OL</sub>	Low-level output current	V <sub>CC</sub> = 1.65 V	4		mA
		V <sub>CC</sub> = 2.3 V	8		
		V <sub>CC</sub> = 3 V	16		
			24		
		V <sub>CC</sub> = 4.5 V	32		
Δt/Δv	Input transition rise or fall rate	V <sub>CC</sub> = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V	20		ns/V
		V <sub>CC</sub> = 3.3 V ± 0.3 V	10		
		V <sub>CC</sub> = 5 V ± 0.5 V	5		
T <sub>A</sub>	Operating free-air temperature	YZP Package	–40	85	°C
		RSE Package			
		DCT Package	–40	125	
		DCU Package			

(1) All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

## ELECTRICAL CHARACTERISTICS

over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	V <sub>CC</sub>	MIN	TYP <sup>(1)</sup>	MAX	UNIT
V <sub>OH</sub>		I <sub>OH</sub> = -100 μA	1.65 V to 5.5 V	V <sub>CC</sub> - 0.1			V
		I <sub>OH</sub> = -4 mA	1.65 V	1.2			
		I <sub>OH</sub> = -8 mA	2.3 V	1.9			
		I <sub>OH</sub> = -16 mA	3 V	2.4			
		I <sub>OH</sub> = -24 mA		2.3			
		I <sub>OH</sub> = -32 mA	4.5 V	3.8			
V <sub>OL</sub>		I <sub>OL</sub> = 100 μA	1.65 V to 5.5 V			0.1	V
		I <sub>OL</sub> = 4 mA	1.65 V			0.45	
		I <sub>OL</sub> = 8 mA	2.3 V			0.3	
		I <sub>OL</sub> = 16 mA	3 V			0.4	
		I <sub>OL</sub> = 24 mA				0.55	
		I <sub>OL</sub> = 32 mA	4.5 V			0.55	
I <sub>I</sub>	Data or control inputs	V <sub>I</sub> = 5.5 V or GND	0 to 5.5 V			±5	μA
I <sub>off</sub>		V <sub>I</sub> or V <sub>O</sub> = 5.5 V	0			±10	μA
I <sub>CC</sub>		V <sub>I</sub> = 5.5 V or GND, I <sub>O</sub> = 0	1.65 V to 5.5 V			10	μA
ΔI <sub>CC</sub>		One input at V <sub>CC</sub> - 0.6 V, Other inputs at V <sub>CC</sub> or GND	3 V to 5.5 V			500	μA
C <sub>i</sub>		V <sub>I</sub> = V <sub>CC</sub> or GND	3.3 V			5	pF

 (1) All typical values are at V<sub>CC</sub> = 3.3 V, T<sub>A</sub> = 25°C.

## TIMING REQUIREMENTS

over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

Parameter	From	To	85°C								125°C				UNIT
			V <sub>CC</sub> = 1.8 V		V <sub>CC</sub> = 2.5 V		V <sub>CC</sub> = 3.3 V		V <sub>CC</sub> = 5 V		V <sub>CC</sub> = 3.3 V		V <sub>CC</sub> = 5 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
f <sub>clock</sub>			80		175		175		200		175		200		MHz
t <sub>w</sub>	CLK		6.2	2.7	2.7	2	2.7	2	2.7	2	2.7	2	2	ns	
	$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$ low		6.2	2.7	2.7	2	2.7	2	2.7	2	2.7	2	2	ns	
t <sub>su</sub>	Data		2.9	1.7	1.3	1.1	1.3	1.1	1.3	1.1	1.3	1.1	ns		
	$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$ inactive		1.9	1.4	1.2	1	1.2	1	1.2	1.2	1.2	1.2	ns		
t <sub>h</sub>			0	0.3	1.2	0.5	1.2	0.5	1.2	0.5	1.2	0.5	ns		

## SWITCHING CHARACTERISTICS

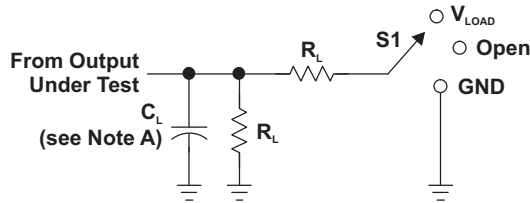
over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

Parameter	From	To	85°C								125°C				UNIT
			V <sub>CC</sub> = 1.8 V		V <sub>CC</sub> = 2.5 V		V <sub>CC</sub> = 3.3 V		V <sub>CC</sub> = 5 V		V <sub>CC</sub> = 3.3 V		V <sub>CC</sub> = 5 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
f <sub>max</sub>			80		175		175		200		175		200		MHz
t <sub>pd</sub>	CLK	Q	4.8	13.4	2.2	7.1	2.2	5.9	1.4	4.1	2.2	7.9	1.4	6.1	ns
		$\overline{\text{Q}}$	6	14.4	3	7.7	2.6	6.2	1.6	4.4	2.6	8.2	1.6	6.4	
	$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$ low	Q or $\overline{\text{Q}}$	4.4	12.9	2.3	7	1.7	5.9	1.6	4.1	1.7	7.9	1.6	6.1	

**OPERATING CHARACTERISTICS** $T_A = 25^\circ\text{C}$ 

PARAMETER	TEST CONDITIONS	$V_{CC} = 1.8\text{ V}$	$V_{CC} = 2.5\text{ V}$	$V_{CC} = 3.3\text{ V}$	$V_{CC} = 5\text{ V}$	UNIT
		TYP	TYP	TYP	TYP	
$C_{pd}$ Power dissipation capacitance	$f = 10\text{ MHz}$	35	35	37	40	pF

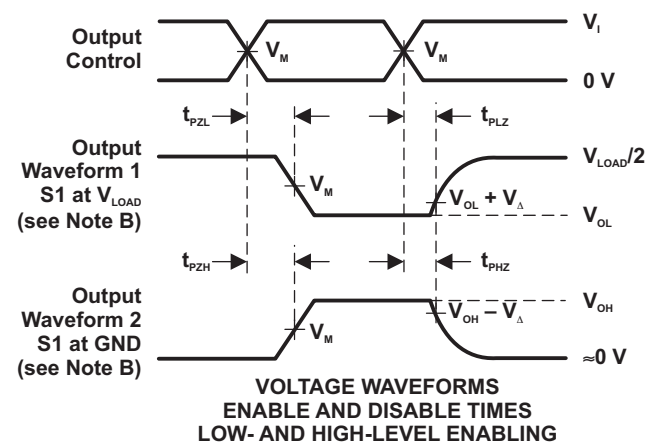
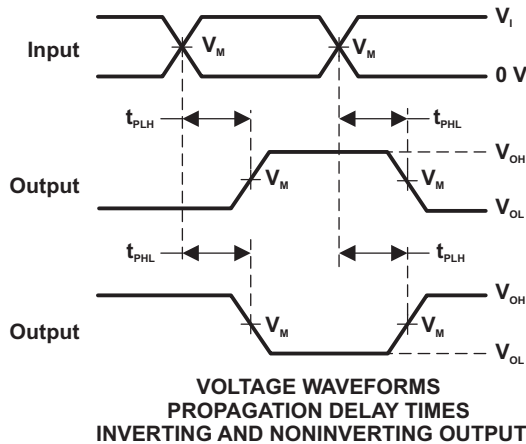
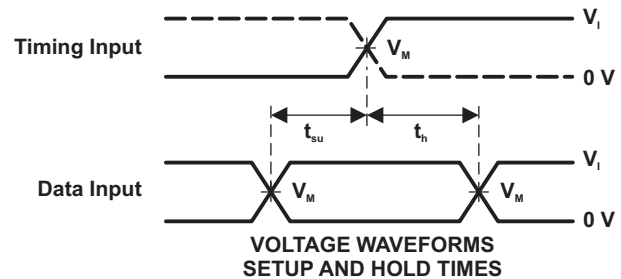
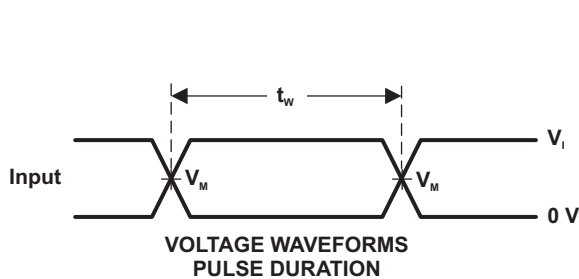
PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT

TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	GND

$V_{CC}$	INPUTS		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_I$	$t/t_i$					
$1.8\text{ V} \pm 0.15\text{ V}$	$V_{CC}$	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	1 k $\Omega$	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	$V_{CC}$	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	500 $\Omega$	0.15 V
$3.3\text{ V} \pm 0.3\text{ V}$	3 V	$\leq 2.5\text{ ns}$	1.5 V	6 V	50 pF	500 $\Omega$	0.3 V
$5\text{ V} \pm 0.5\text{ V}$	$V_{CC}$	$\leq 2.5\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	50 pF	500 $\Omega$	0.3 V



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.  
 C. All input pulses are supplied by generators having the following characteristics: PRR  $\leq$  10 MHz,  $Z_o = 50\ \Omega$ .  
 D. The outputs are measured one at a time, with one transition per measurement.  
 E.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .  
 F.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .  
 G.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .  
 H. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

## REVISION HISTORY

<b>Changes from Original (October 2009) to Revision A</b>	<b>Page</b>
• Changed $I_{off}$ description in FEATURES. ....	1
• Changed temperature range for DCT and DCU package from (–40°C to 85°C) to (–40°C to 125°). ....	2
• Changed TIMING REQUIREMENTS table. ....	5
• Changed SWITCHING CHARACTERISTICS table. ....	5
<b>Changes from Revision A (November 2011) to Revision B</b>	<b>Page</b>
• Added SN74LVC1G74DCURG4 part number to ORDERING INFORMATION table. ....	2
<b>Changes from Revision B (MARCH 2012) to Revision C</b>	<b>Page</b>
• Added preview for RSE part .....	2
• Added QFN package ordering information .....	2

**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
SN74LVC1G74DCT3	PREVIEW	SM8	DCT	8	250	TBD	Call TI	Call TI	
SN74LVC1G74DCTR	ACTIVE	SM8	DCT	8	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC1G74DCTRE6	PREVIEW	SM8	DCT	8	3000	TBD	Call TI	Call TI	
SN74LVC1G74DCU	PREVIEW	US8	DCU	8	3000	TBD	Call TI	Call TI	
SN74LVC1G74DCU6	PREVIEW	US8	DCU	8	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC1G74DCUR	ACTIVE	US8	DCU	8	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC1G74DCURG4	ACTIVE	US8	DCU	8	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC1G74DCUT	ACTIVE	US8	DCU	8	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC1G74DQER	PREVIEW	X2SON	DQE	8	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC1G74RSE2	PREVIEW	UQFN	RSE	8	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC1G74RSER	PREVIEW	UQFN	RSE	8	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC1G74YZPR	PREVIEW	DSBGA	YZP	8	3000	TBD	Call TI	Call TI	
SN74LVC1G74YZTR	PREVIEW	DSBGA	YZT	8	3000	TBD	Call TI	Call TI	

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

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<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

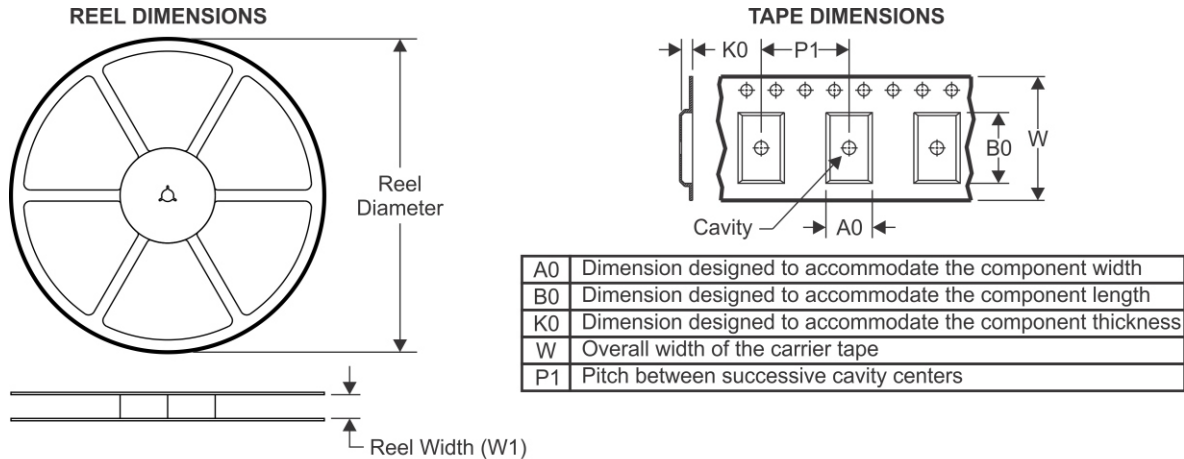
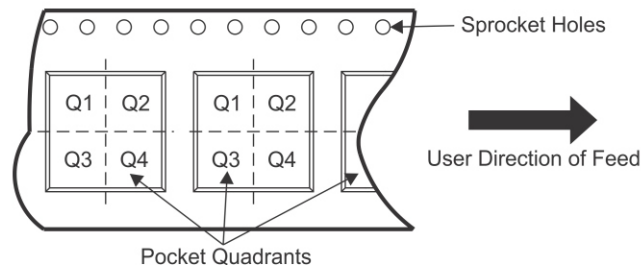
**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

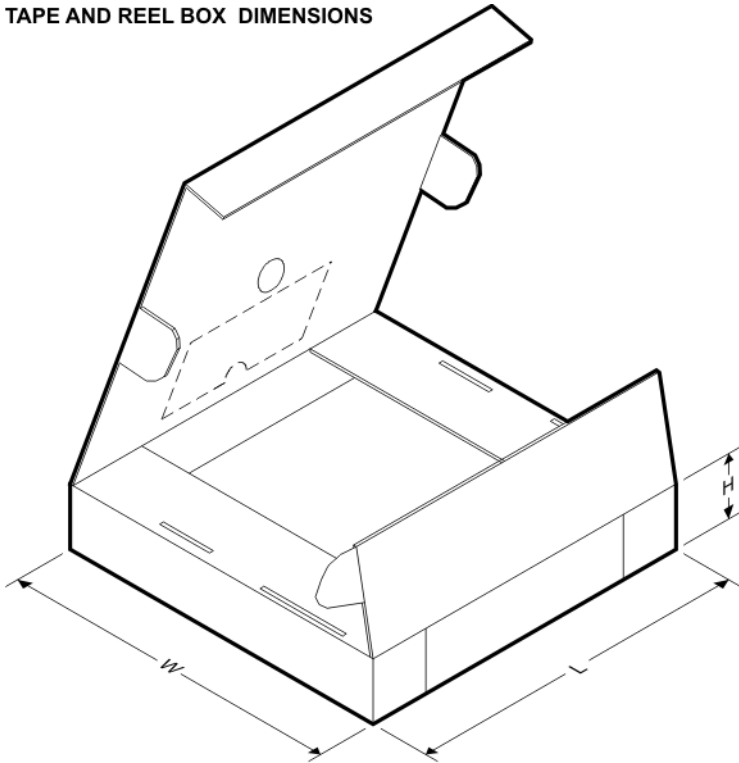
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**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

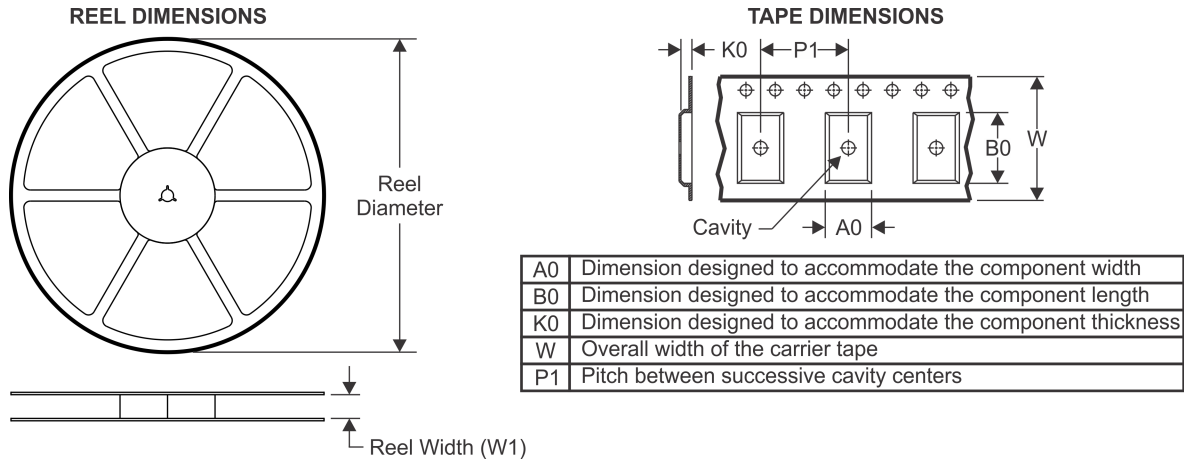
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC1G74DCTR	SM8	DCT	8	3000	180.0	13.0	3.35	4.5	1.55	4.0	12.0	Q3
SN74LVC1G74DCUR	US8	DCU	8	3000	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC1G74DCURG4	US8	DCU	8	3000	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC1G74DCUT	US8	DCU	8	250	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC1G74RSER	UQFN	RSE	8	3000	179.0	8.4	1.7	1.7	0.76	4.0	8.0	Q1
SN74LVC1G74RSE2	UQFN	RSE	8	3000	179.0	8.4	1.7	1.7	0.76	4.0	8.0	Q3
SN74LVC1G74DQER	X2SON	DQE	8	5000	180.0	8.4	1.2	1.6	0.55	4.0	8.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


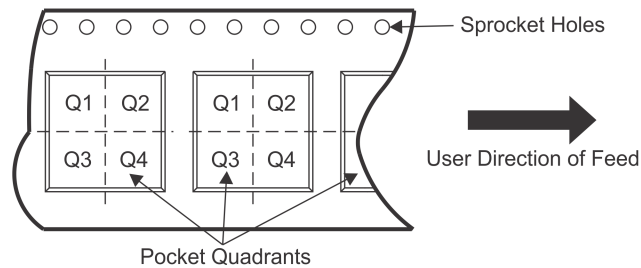
\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC1G74DCTR	SM8	DCT	8	3000	182.0	182.0	20.0
SN74LVC1G74DCUR	US8	DCU	8	3000	202.0	201.0	28.0
SN74LVC1G74DCURG4	US8	DCU	8	3000	202.0	201.0	28.0
SN74LVC1G74DCUT	US8	DCU	8	250	202.0	201.0	28.0
SN74LVC1G74RSE	UQFN	RSE	8	3000	203.0	203.0	35.0
SN74LVC1G74RSE2	UQFN	RSE	8	3000	203.0	203.0	35.0
SN74LVC1G74DQER	X2SON	DQE	8	5000	220.0	220.0	35.0

## TAPE AND REEL INFORMATION

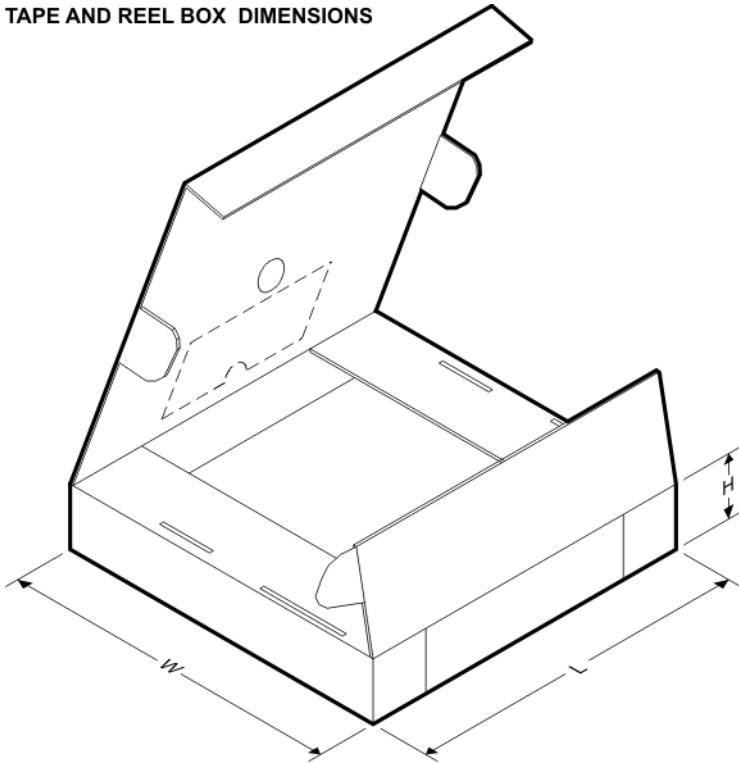


### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC1G74DCTR	SM8	DCT	8	3000	180.0	13.0	3.35	4.5	1.55	4.0	12.0	Q3
SN74LVC1G74DCUR	US8	DCU	8	3000	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC1G74DCURG4	US8	DCU	8	3000	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC1G74DCUT	US8	DCU	8	250	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3
SN74LVC1G74DQER	X2SON	DQE	8	5000	180.0	9.5	1.15	1.6	0.5	4.0	8.0	Q1
SN74LVC1G74RSE2	UQFN	RSE	8	3000	180.0	9.5	1.7	2.3	0.75	4.0	8.0	Q3
SN74LVC1G74RSER	UQFN	RSE	8	3000	180.0	9.5	1.7	2.3	0.75	4.0	8.0	Q2

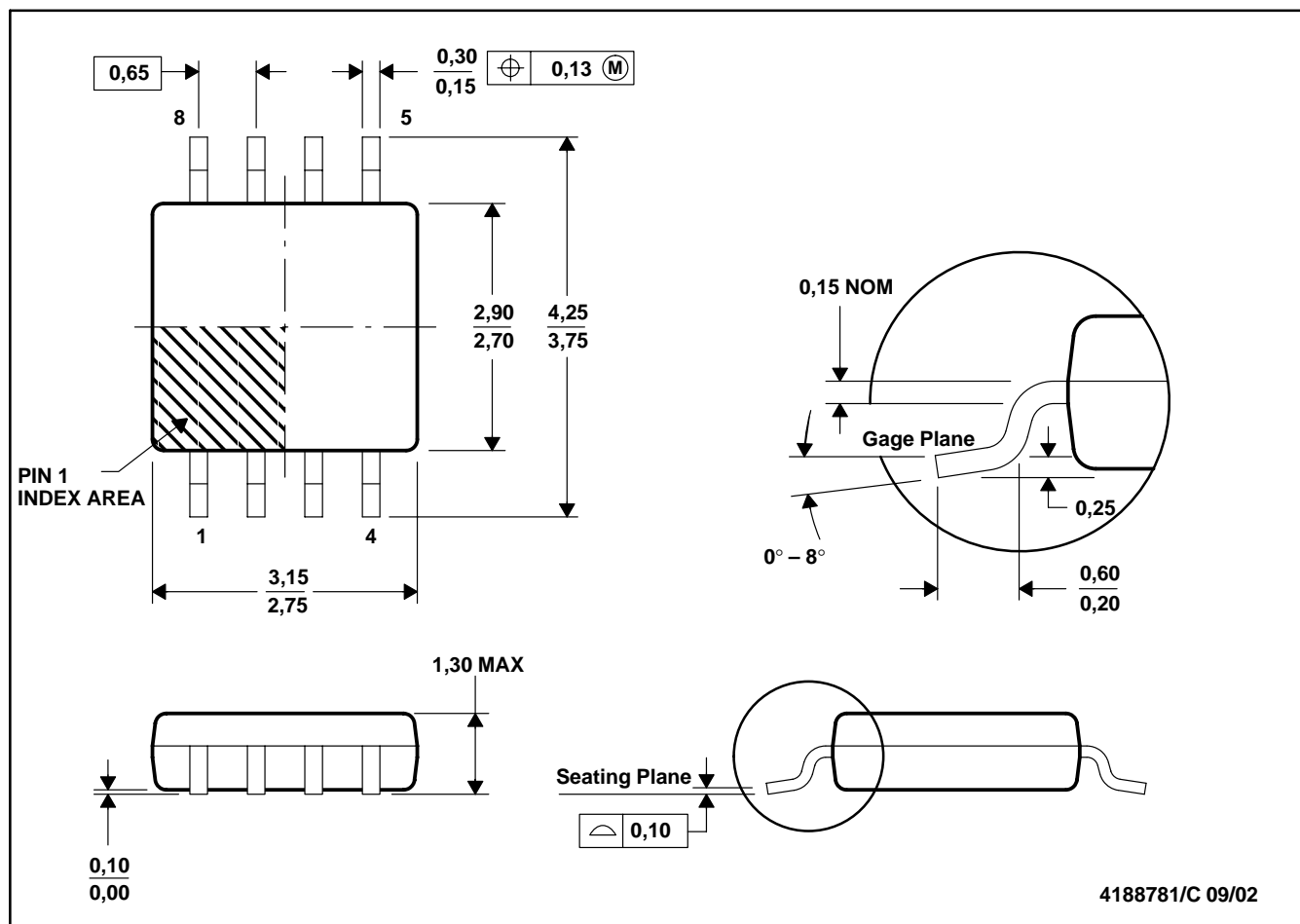
**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC1G74DCTR	SM8	DCT	8	3000	182.0	182.0	20.0
SN74LVC1G74DCUR	US8	DCU	8	3000	202.0	201.0	28.0
SN74LVC1G74DCURG4	US8	DCU	8	3000	202.0	201.0	28.0
SN74LVC1G74DCUT	US8	DCU	8	250	202.0	201.0	28.0
SN74LVC1G74DQER	X2SON	DQE	8	5000	180.0	180.0	30.0
SN74LVC1G74RSE2	UQFN	RSE	8	3000	180.0	180.0	30.0
SN74LVC1G74RSER	UQFN	RSE	8	3000	180.0	180.0	30.0

## DCT (R-PDSO-G8)

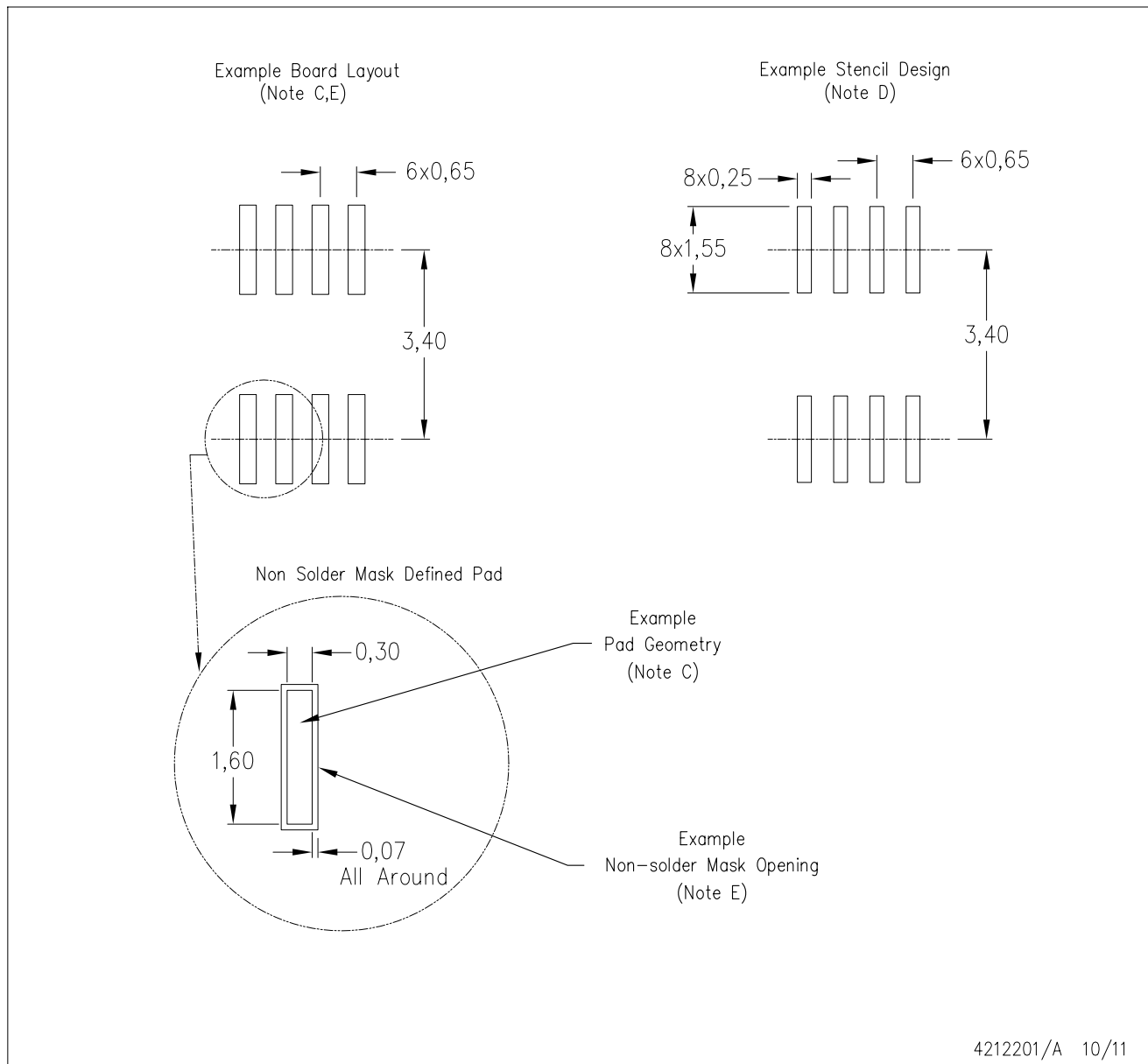
## PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion.
  - Falls within JEDEC MO-187 variation DA.

DCT (R-PDSO-G8)

PLASTIC SMALL OUTLINE

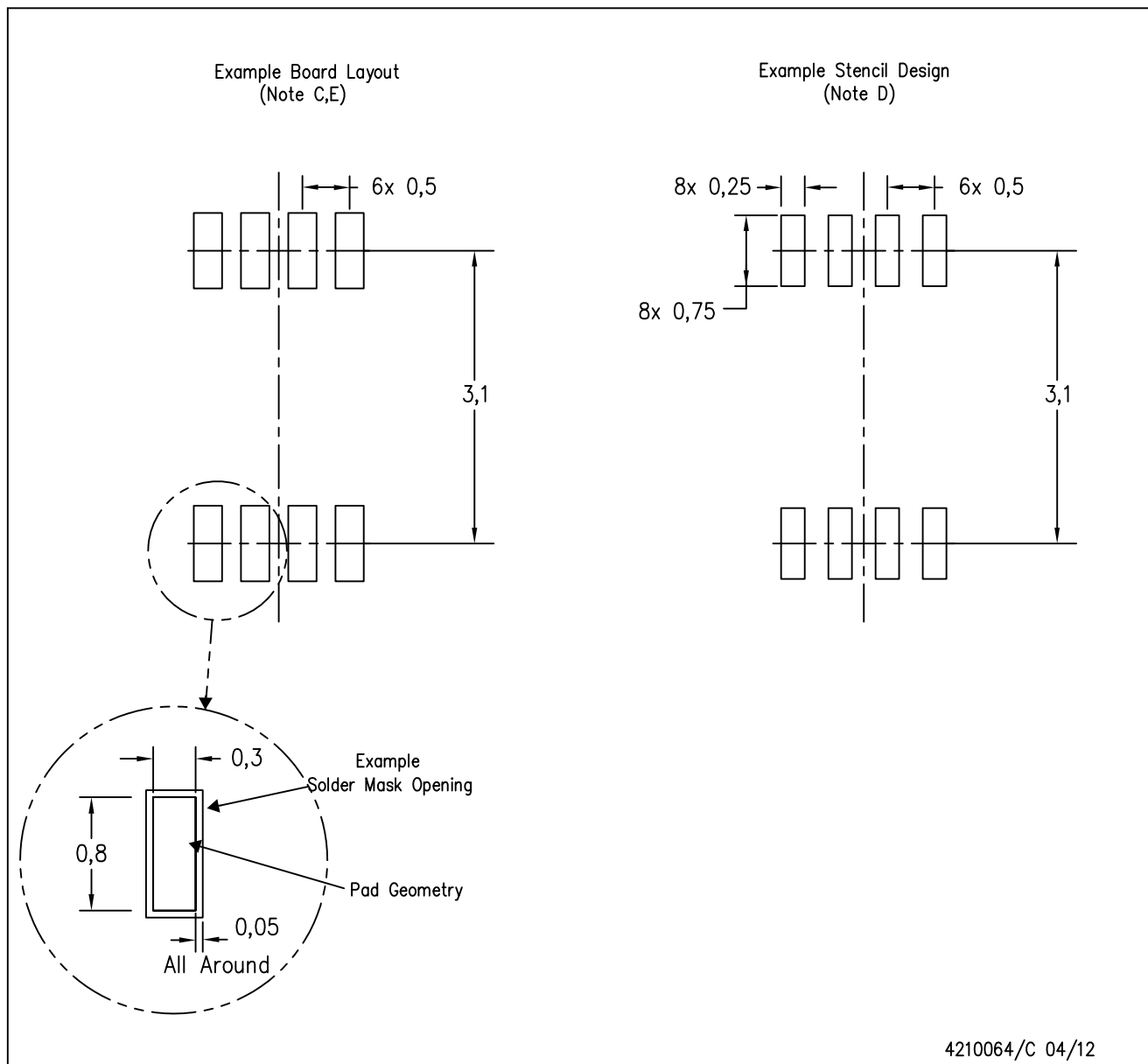


- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate designs.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525.
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



DCU (S-PDSO-G8)

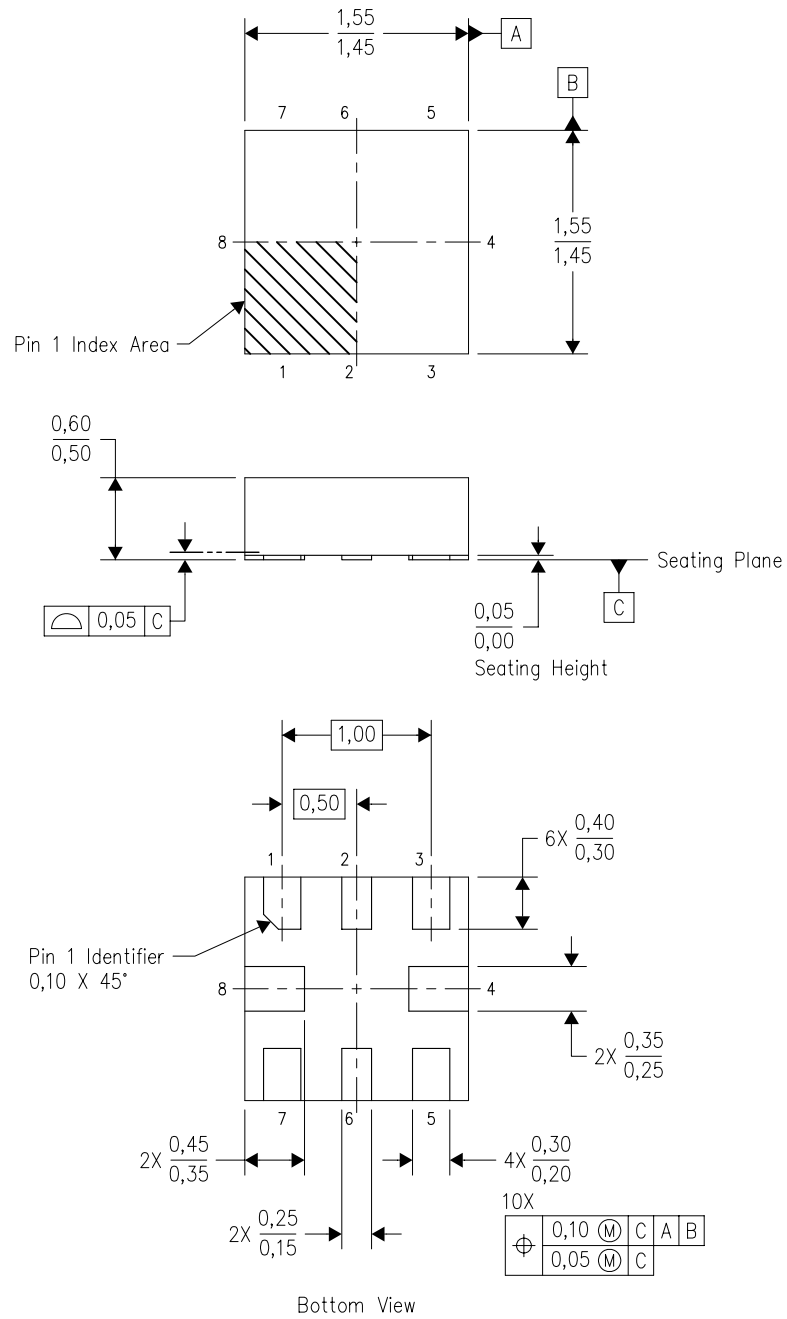
PLASTIC SMALL OUTLINE PACKAGE (DIE DOWN)



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate designs.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

RSE (S-PUQFN-N8)

PLASTIC QUAD FLATPACK NO-LEAD

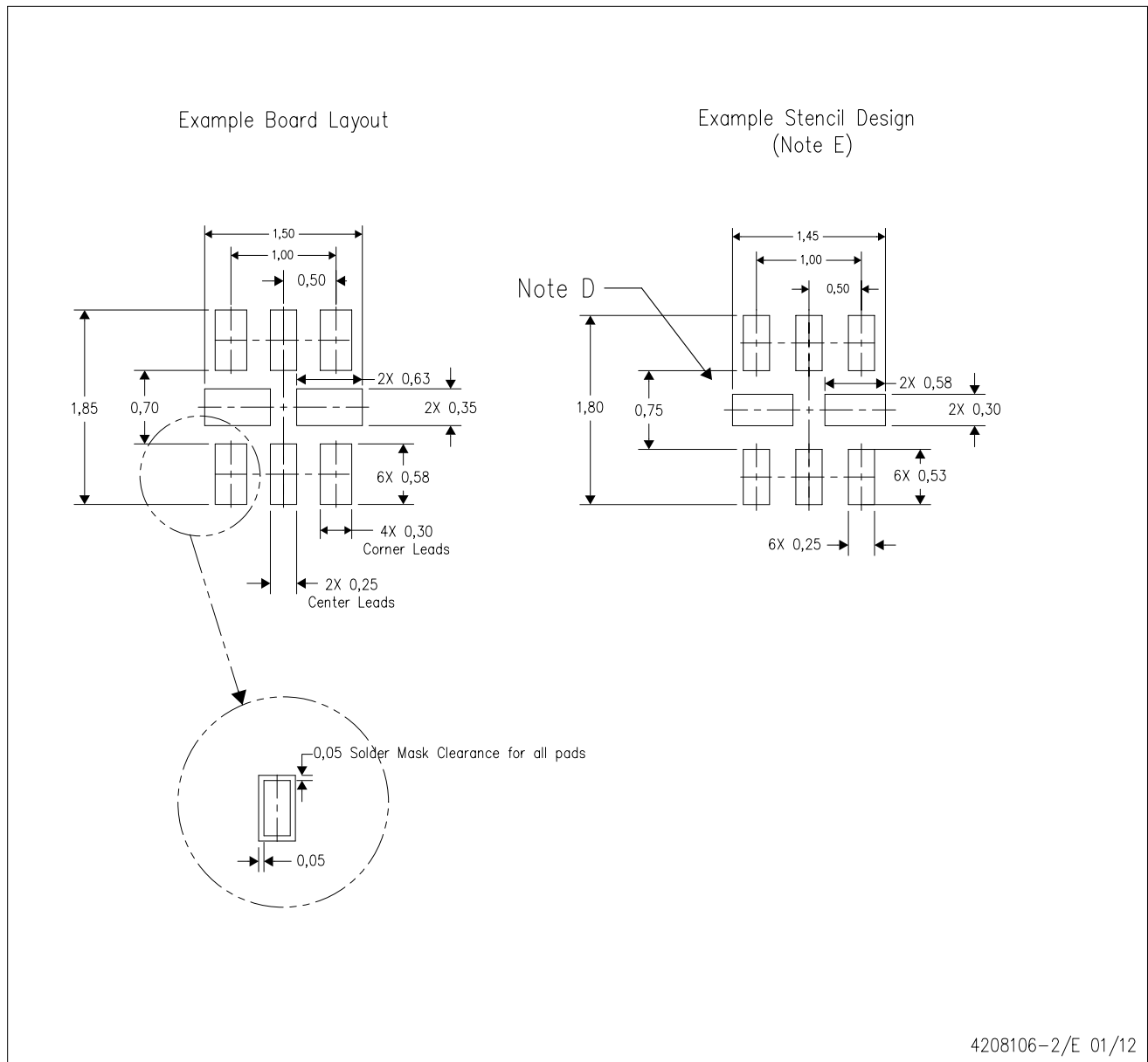


4207268-2/D 01/11

- NOTES:
- All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - This drawing is subject to change without notice.
  - QFN (Quad Flatpack No-Lead) package configuration.
  - This package complies to JEDEC MO-288 variation UECD.

RSE (S-PUQFN-N8)

PLASTIC QUAD FLATPACK NO-LEAD

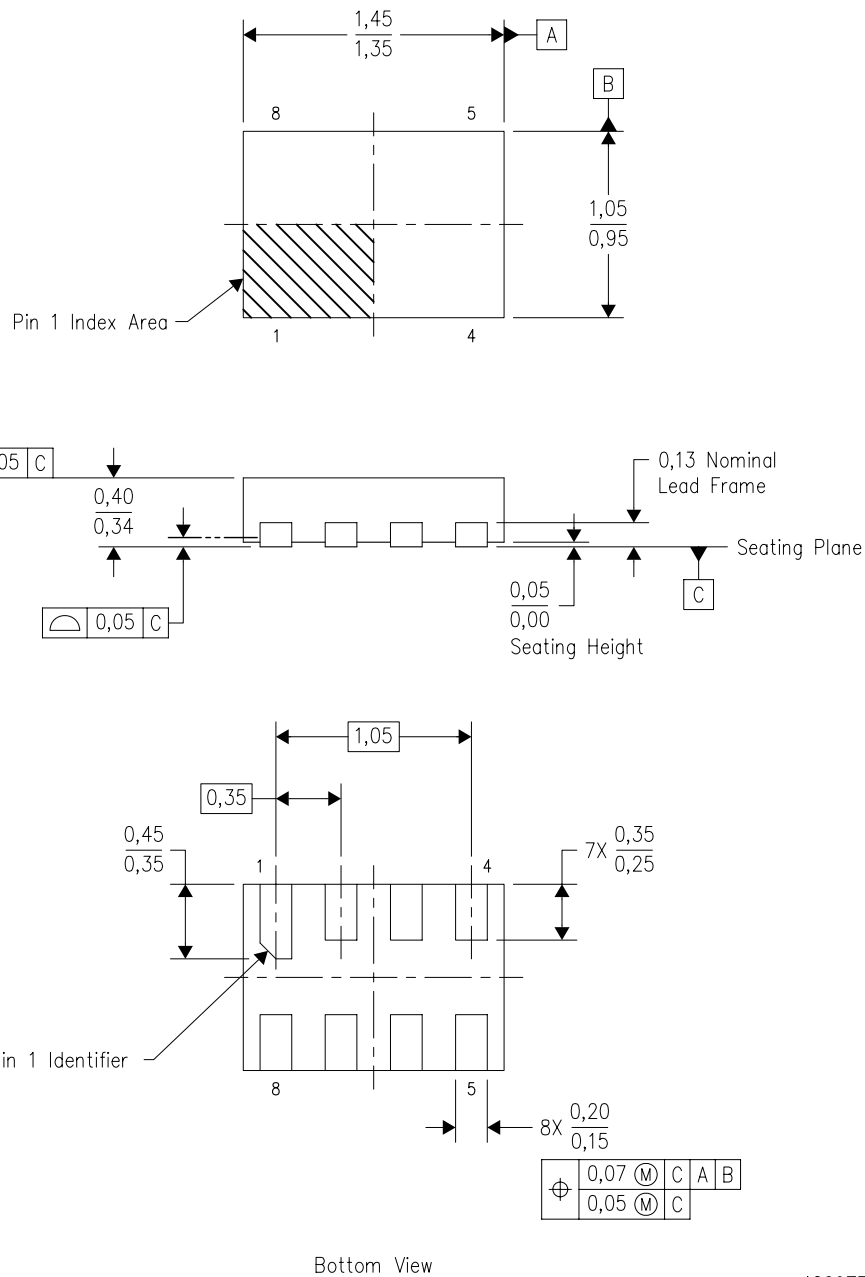


4208106-2/E 01/12

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate designs.
  - D. Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.
  - E. Maximum stencil thickness 0,127 mm (5 mils). All linear dimensions are in millimeters.
  - F. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
  - G. Side aperture dimensions over-print land for acceptable area ratio > 0.66. Customer may reduce side aperture dimensions if stencil manufacturing process allows for sufficient release at smaller opening.

DQE (R-PX2SON-N8)

PLASTIC SMALL OUTLINE NO-LEAD

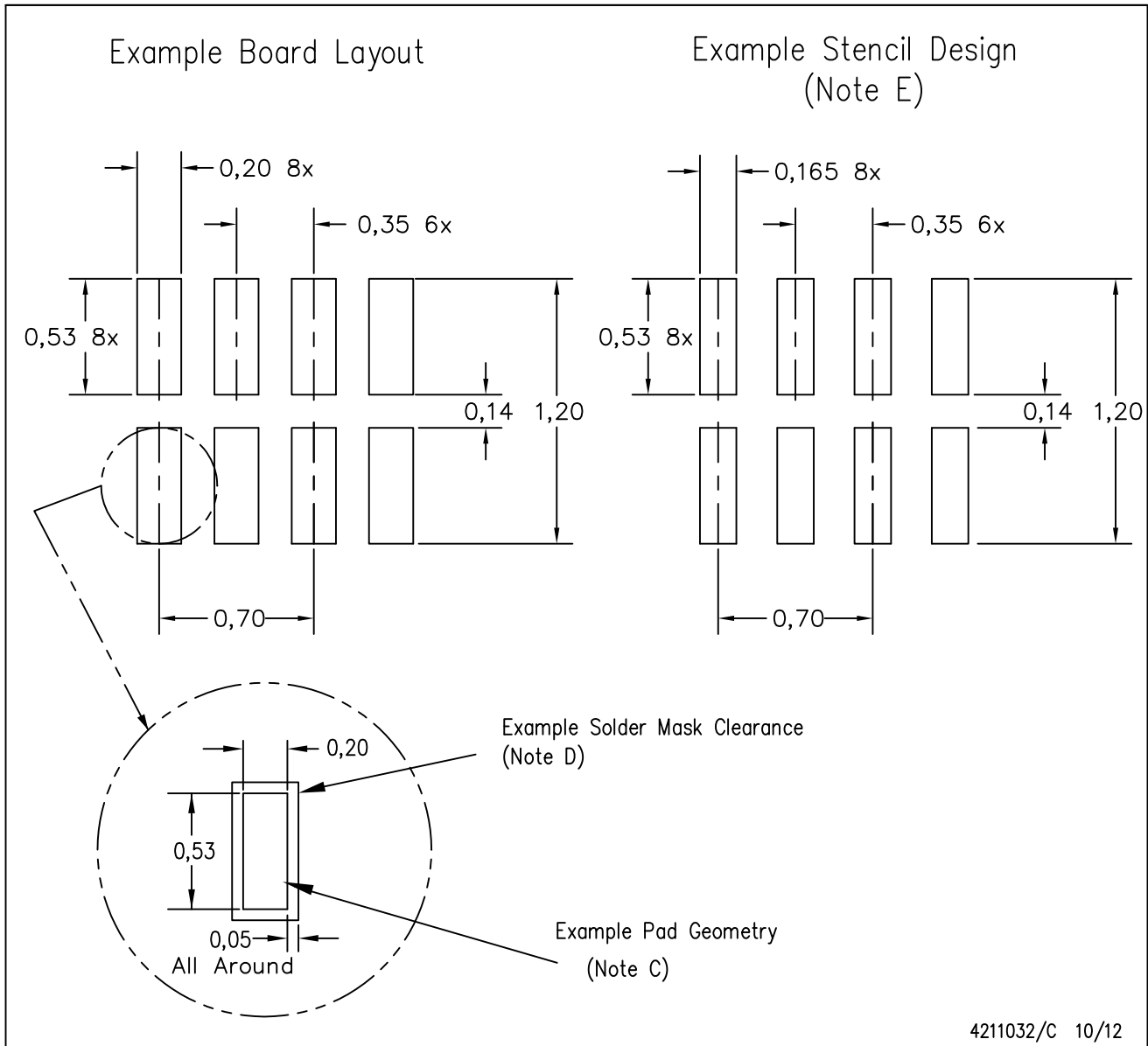


4209779/B 10/2008

- NOTES:
- All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - This drawing is subject to change without notice.
  - SON (Small Outline No-Lead) package configuration.
  - This package complies to JEDEC MO-287 variation X2EAF.

DQE (R-PX2SON-N8)

PLASTIC SMALL OUTLINE NO-LEAD

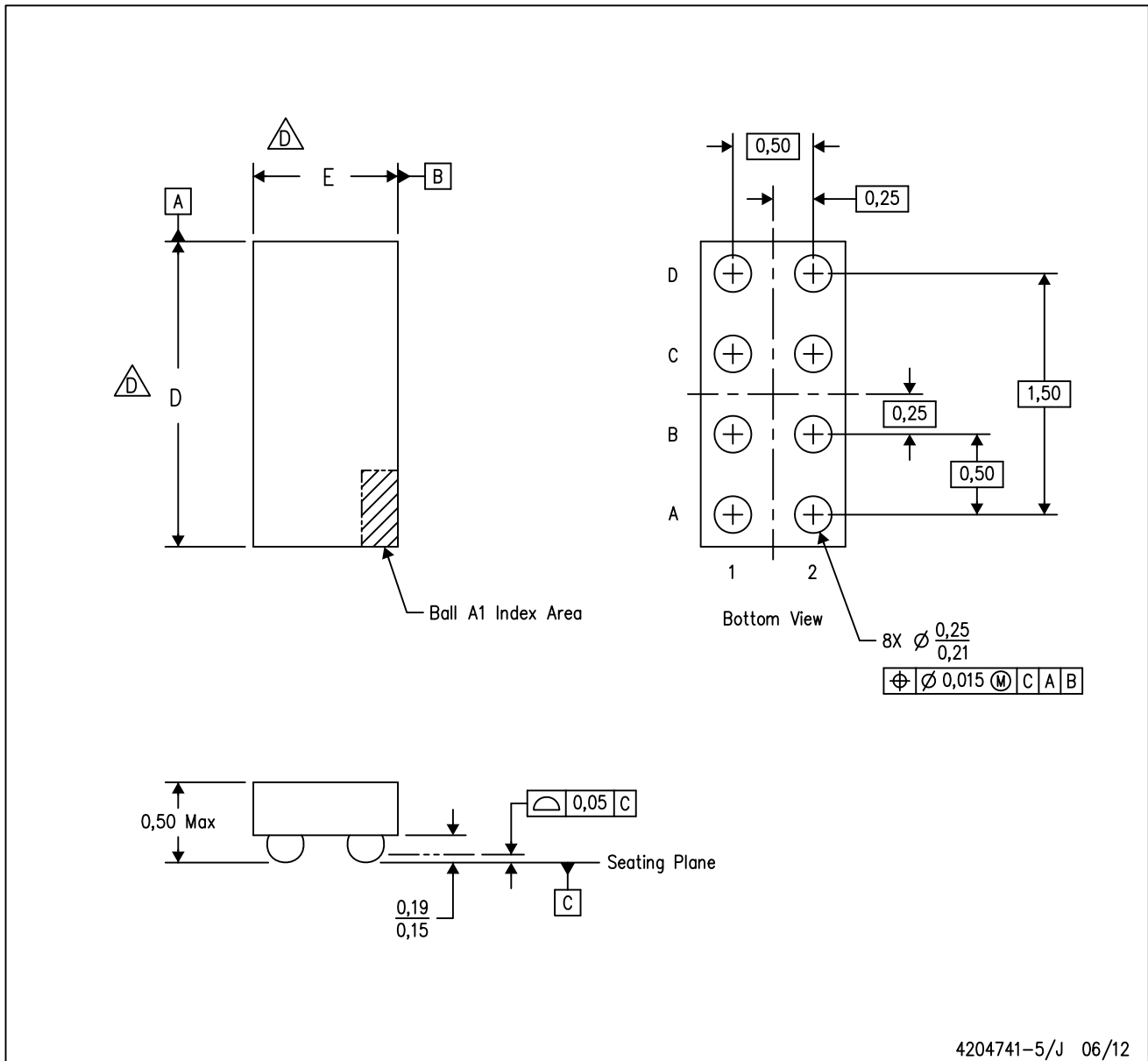


4211032/C 10/12

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate designs.
  - D. Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.  
If 2 mil solder mask is outside PCB vendor capability, it is advised to omit solder mask.
  - E. Maximum stencil thickness 0,1016 mm (4 mils). All linear dimensions are in millimeters.
  - F. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
  - G. Over-printing land for acceptable area ratio is not viable due to land width and bridging potential. Customer may further reduce side aperture dimensions if stencil manufacturing process allows for sufficient release at smaller opening.
  - H. Suggest stencils cut with lasers such as Fiber Laser that produce the greatest positional accuracy.
  - I. Component placement force should be minimized to prevent excessive paste block deformation.

YZP (R-XBGA-N8)

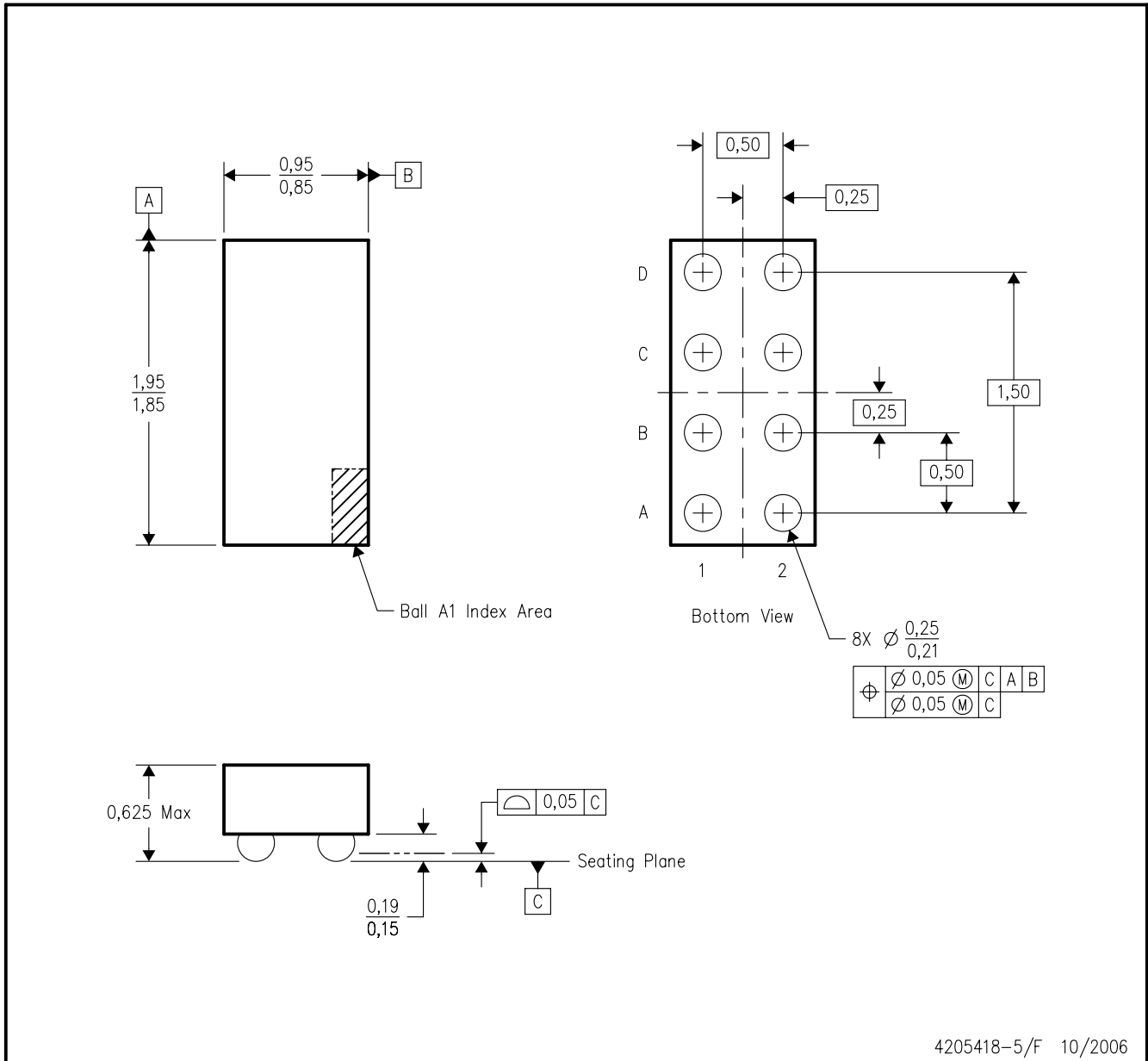
DIE-SIZE BALL GRID ARRAY



- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. NanoFree™ package configuration.
  - $\triangle$  The package size (Dimension D and E) of a particular device is specified in the device Product Data Sheet version of this drawing, in case it cannot be found in the product data sheet please contact a local TI representative.
  - E. This package is a Pb-free solder ball design. Refer to the 8 YEP package (drawing 4204725) for tin-lead (SnPb).

YZT (R-XBGA-N8)

DIE-SIZE BALL GRID ARRAY



4205418-5/F 10/2006

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. NanoFree™ package configuration.
  - D. This package is Lead-free. Refer to the 8 YET package (drawing 4205421) for tin-lead (SnPb).

NanoFree is a trademark of Texas Instruments.

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